

# Madicken Munk

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3115B Etcheverry Hall, University of California, Berkeley

## Education

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### University of California, Berkeley

September 2011-September 2016

*PhD Graduate Student, Nuclear Engineering*

*Master of Science, Nuclear Engineering*

### Oregon State University

September 2007-June 2011

*Bachelor of Science, Nuclear Engineering*

## Research Interests

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Computational methods for neutron transport, hybrid deterministic / monte carlo neutron transport, advanced nuclear reactor systems, reactor physics, nontraditional applications of nuclear science, development of strongly coupled multi physics systems.

## Research Experience

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University of California, Berkeley Nuclear Engineering Department August 2011 to Present

- Developed hybrid deterministic / monte-carlo transport method to reduce variance reduction in shielding problems with strong angular anisotropy. (**Collaboration with ORNL**) [Denovo  $S_N$ , MCNP]
- Design of a neutron source for in-situ irradiation of geological samples for  $^{40}\text{Ar}/^{39}\text{Ar}$  geochronology of martian samples. (**Collaboration with Scottish Universities Environmental Research Centre (SUERC)**). [MCNP5]
- Evaluated lifetime of graphite reactor core component in FHR limited by radiation-induced swelling. [MCNP5, COMSOL]
- Designed a fluoride salt-cooled high temperature test reactor (FHTTR) reactor core design. [MCNP5, ORIGEN]

Oregon State University Radiation Center

June 2008 to August 2011

- Calculated Molybdenum-99 production in the Oregon State TRIGA reactor from specifically designed targets [MCNP5].
- Verification of Reed College reactor for updated Safety Analysis Report and license renewal [MCNP5].

## Teaching Experience

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NE 155, *Introduction to Numerical Simulations in Radiation Transport*

Spring 2014

- Graduate Student Instructor: office hours, midterm review sessions, grading, two guest lectures

NE 250, *Nuclear Reactor Theory*

Spring 2012

- Graduate Student Instructor: office hours, midterm review sessions, weekly review sessions, grading

NE 101, *Nuclear Reactions and Radiation*

Fall 2011, 2014

- Graduate Student Instructor: office hours, weekly review lectures, grading
- Awarded "Outstanding Graduate Student Instructor Award"

## Mentorship Experience

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**Garrett Baltz** (2015-2016) – facilitated the creation and development of dry cask storage input files for both SCALE 6.2b and MCNP6. Advised garrett on graduate school application process. Helped to develop skills relevant to health and medical physics.

## Scholarships and Awards

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| • ANS Best Graduate Paper Award, Student Conference         | Spring 2014 |
| • Outstanding Graduate Student Instructor Award             | 2013-2014   |
| • UC Regents Fellowship, UC Berkeley                        | 2014        |
| • NRC Fellowship, UC Berkeley                               | 2011-2012   |
| • DOE NEUP Scholarship Awardee                              | 2010-2011   |
| • Karena Dokken Memorial Scholarship Recipient              | Spring 2010 |
| • Awarded NRC Scholarship by OSU department of NE/RHP       | Fall 2009   |
| • Awarded National Academy for Nuclear Training Scholarship | Summer 2009 |
| • Grund Memorial Scholarship Awardee                        | Fall 2009   |
| • DOE NEUP Scholarship Awardee                              | 2009-2010   |
| • Intel Scholar   | Summer 2008 |

## Publications, Presentations and Patents

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- “An Angle-Informed Method for CADIS and FW-CADIS,” Munk, M., Slaybaugh, R. N., PHYSOR 2016, Sun Valley, ID, May 2016 (**submitted**)
- “Instrumentation Development for planetary in-situ  $^{40}\text{Ar}/^{39}\text{Ar}$  Geochronology,” Morgan, L., Davidheiser-Kroll, B., Munk M., et al., Acta Astronautica, 2015 (**submitted**)
- “Design and Feasibility Study of a Compact Neutron Source for Extra-terrestrial Geochronology Applications,” Munk, M., Morgan, L., Davidheiser-Kroll, B., et al., Joint International Conference on Mathematics and Computation (M&C), Nashville, TN, April 2015
- “Instrumentation Development for planetary in-situ  $^{40}\text{Ar}/^{39}\text{Ar}$  Geochronology”, Munk, M., Morgan, L., Davidheiser-Kroll, B., et al., poster presentation, American Nuclear Society Winter Meeting, November 2014
- “Instrumentation Development for planetary in-situ  $^{40}\text{Ar}/^{39}\text{Ar}$  Geochronology”, Morgan, L., Davidheiser-Kroll, B., Munk M., et al., poster presentation, Goldschmidt Conference June 2014
- “Use of Comsol Multiphysics for the Evaluation Of Radiation-Induced Stresses in the PB-FHR”, Munk, M., paper presentation, ANS student conference, April 2014
- A. Cisneros et al., "Fluoride-Salt-Cooled, High-Temperature Reactor (FHR) Methods and Experiments Program White Paper." UCBTH-12-002, Department of Nuclear Engineering, UC Berkeley (2013).
- G. Cao et al., "Fluoride-Salt-Cooled, High-Temperature Reactor (FHR) Matierals, Fuels and Components White Paper." UCBTH-12-003, Department of Nuclear Engineering, UC Berkeley (2013).
- D. Carpenter et al., "Fluoride-Salt-Cooled, High-Temperature Reactor (FHR) Development Roadmap and Test Reactor Performance Requirements White Paper." UCBTH-12-004, Department of Nuclear Engineering, UC Berkeley (2013).
- “Preliminary Design of a FHR Test Reactor Core”, Munk, M., Cisneros, A. T., Greenspan, E., Peterson, P.F., paper presentation, ANS national conference, June 2012.
- “Molybdenum Production in a Low-Power Reactor”, Palmer, T.S., Reese, S., Keller, S.T., Munk, M., application submitted July 2010, **Patent Pending**
- *Optimization of Molybdenum-99 Production in Oregon State TRIGA Reactor*, Madicken Munk, conference presentation, ANS national student conference 2010.
- *Production of Medical Isotope in Oregon State University TRIGA Reactor*, Madicken Munk, poster presentation. 1<sup>st</sup> International Nuclear Energy Conference, Warsaw, Poland, April 2011.

## Service

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- Vice President of University of California, Berkeley Chapter of Alpha Nu Sigma, 2013-Present
- President of Oregon State University student American Nuclear Society chapter, 2011-2012

- Secretary of Oregon State University student American Nuclear Society chapter, 2009-2011
- Member of Alpha Nu Sigma, Nuclear Engineering Honors Society, inducted May 2011
- President of Mentors and Mentees, an undergraduate peer-mentoring program at OSU.
- College of Engineering Ambassador, Oregon State University